

# HARD GRASS (*SCLEROCHLOA DURA*, POACEAE) IN THE UNITED STATES

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## ABSTRACT

The introduction and spread of *Sclerochloa dura* (Poaceae) in the United States are traced. Included is a detailed description of the species.

On 26 April 1928 a grass was collected along a roadside between Salt Lake City and Ogden, Utah. The collector, C.W. Fallas (misspelled "Fallas" in several publications), unable to identify it, sent a specimen to the Smithsonian Institution. Eventually the grass was described as a new genus and species, *Crassipes annuus*, by Swallen (1931), said by him to be most closely related to the European *Oreochloa* Link and to be near the North American *Orcuttia* Vasey.

In the early 1930s, several collections of this grass from Colorado, Utah, and Washington were distributed under the name *C. annuus*. Fallas' grass was, however, not one "generically distinct from any previously known" (Swallen 1931). In the first *Manual of the grasses of the United States* (Hitchcock 1935), it found its rightful place as a synonym of the European *Sclerochloa dura* (L.) Beauv. (Fig. 1), the plant's correct name.

The earliest U.S. collection of *S. dura* that we have seen was made "about the wool mill" in Yonkers, New York state, in 1895 (*Bicknell s.n.*, 5 May 1895, NY); the species has apparently not been found again in New York. Thirty-three years later, in 1928, the grass was collected in Utah for the first time. The additional states from which we have seen specimens of hard grass — and the dates of the earliest collections of it known to us from these states — are Colorado, 1931; Idaho and Washington, 1932; California, 1935; Oregon, 1937; Texas, 1944; Kansas, 1961; Missouri, 1972 (first reported by Ladd [1983]); Oklahoma, 1973 (first reported by Goodman [1974]); Arkansas, 1976; Georgia and Nebraska, 1982;

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Tennessee, 1985 (first reported by Freckmann [1988]); Maryland, 1986 (first reported by Hill [1988]); Mississippi, 1987; and Ohio, 1990. Data with many of these early collections mentioned that the grass occurred in abundance.

The species was recorded from Louisiana in 1977 (MacRoberts 1977); the collection, though, is actually a depauperate specimen of *Eleusine indica* (Allen 1980). The documented distribution of *S. dura* in the United States is shown in Figure 2.

We have noted reports of the introduction of *S. dura* into Argentina (Rugolo de Agrasar 1980) and Australia (New South Wales, South Australia, and Victoria) (Watson and Dallwitz 1980).

In the United States this grass is, we suggest, under-collected and under-reported. We saw several herbarium specimens of it misidentified as *Poa annua*, a species that hard grass superficially resembles; because of this similarity, *S. dura* is probably ignored in at least some places where it occurs.

It is also certainly under-noticed. For example, on one occasion we spoke with two university botanists, asking them if *S. dura* was on their campus. They checked the Hitchcock *Manual* (Hitchcock 1950) and then searched their campus for the grass; they reported to us that they were unable to find it. A few days later they telephoned with a revision of their report: *S. dura* was in fact the dominant weedy grass in the lawn around their building. Apparently they did not expect it to be a major constituent of a lawn; they had been searching for isolated clumps. We believe that *S. dura* is overlooked elsewhere, too.

Two U.S. weed books that include *S. dura* — Dennis (1980) and Gaines and Swan (1972) — describe the grass as a “lawn pest” and a “nuisance in lawns.” Being typically more or less prostrate, it can escape being mowed. One means of spread of hard grass is possibly via grass seed or, more likely, sod.

Other habitats include campsites, roadsides, golf courses, and especially the most disturbed areas in playgrounds and athletic fields. We suspect that the grass may move from athletic field to athletic field on the cleats of ballplayers' shoes. It can obviously endure severe trampling and can outcompete even *Matricaria matricarioides*, *Poa annua*, and other weeds of these harsh habitats. Ladd (1983) mentioned *Androsace occidentalis*, *Draba brachycarpa*, *Holosteum umbellatum*, *Lepidium virginicum*, and *Veronica arvensis* as other associates. Patzke and Korneck (1982) described a “Sclerochloa-Polygonetum avicularis” community in much disturbed habitats in West Germany (Hessen) in which the associates included *Capsella bursa-pastoris*,

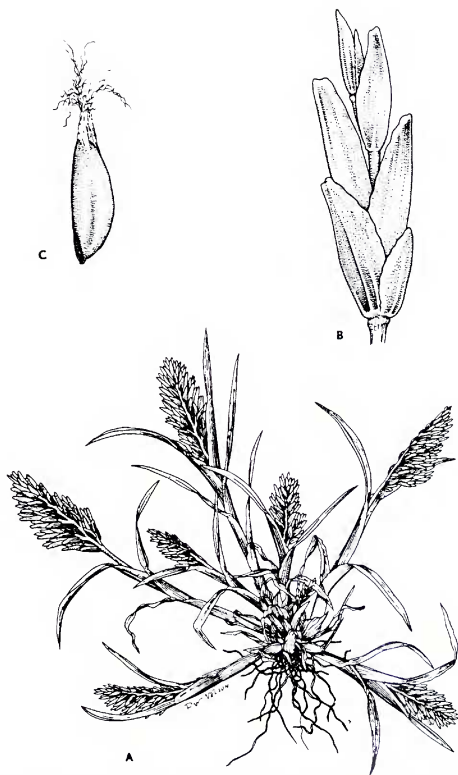


FIG. 1. *Sclerochloa dura*. A, plant,  $\times 2/3$ . B, spikelet,  $\times 7 1/2$ . C, caryopsis,  $\times 10 1/2$ .

*Lolium perenne*, *Matricaria discoidea*, *Poa angustifolia*, *P. annua*, *Polygonum arenastrum*, *Stellaria media*, and *Veronica heterifolia*.

The specimens of *S. dura* we have seen were collected from late winter ("February," Texas) to early summer (20 July, Washington), but mostly from mid April to early June. Green during the first part of the growing season, the plants eventually become light yellow-brown. At this time they are easiest to locate, as areas infested by the species change color. Yellow-brown ballfields are a common sight where the species is dominant. The plants often persist, unshattered and dead, until mid July (at least in Oklahoma and Utah, where most of our observations of growing plants were made). Seed dispersal is often accomplished, we believe, through disturbance of these dried plants. The dispersal units may consist of one or more florets, one or more spikelets, irregular pieces of inflorescence, more or less intact inflorescences, or even entire culms or plants.

Like many grasses, *S. dura* has had a tortured nomenclatural history. It was originally described by Linnaeus (Linnaeus 1753) as *Cynosurus durus*. Thereafter, Scopoli (1772) included it in *Poa*; Villars (1787), in *Festuca*; and Lamarck (1791), in *Eleusine*. Beauvois (1812) established the genus *Sclerachloa* to accommodate the species. There, except for a transfer to *Sesleria* by Kunth (1829), it has rested ever since.

The chromosome number of *S. dura* was reported by Stace (1980) as  $2n = 14$  and by Tšvelev (1983) as  $x = 7$ .

A second species of *Sclerachloa*, *S. woronowii* (Hack.) Tšvelev, originally described as a species of *Scleropoa* in 1912, is known from Syria, Iraq, the Caucasus, and Afghanistan (Bor 1968).

The description of *S. dura* below is based mainly on our study of many herbarium specimens of this species; figures in brackets are literature data we could not confirm. We offer it as a supplement to descriptions of the species we have seen (Bor 1968, 1970; Clayton & Renvoise 1986; Cope 1982; Cronquist et al. 1977; Gould 1975; Gould & Shaw 1983; Hegi 1906; Hitchcock 1935, 1950; Ladd 1983; Maire 1955; Roshevits 1980; Rugolo de Agrasar 1980; Stace 1980; Swallen 1931; Tšvelev 1983; Watson & Dallwitz 1980, 1988). Rosengurt et al. include data on lipids in the central endosperm of *S. dura*; Watson & Dallwitz (1988), data on anatomy (see also Dallwitz [1980] and Watson et al. [1986]).

#### SCLEROCHLOA DURA (L.) Beauv., Ess. Agrost. 98. 1812.

*Cynosurus durus* L., Sp. Pl. ed. 1:72. 1753.

*Poa dura* (L.) Scop., Fl. Carn. 1:70. 1772.

*Festuca dura* (L.) Vill., Hist. Pl. Dauph. 2: 94. 1787.

*Eleusine dura* (L.) Lam., Tab. Encycl. Méth. Bot. 1:203. 1791.

*Sesleria dura* (L.) Kunth, Rév. Gram. 1:110. 1829.

*Crassipes annuus* Swallen, Amer. J. Bot. 18:684. 1931.

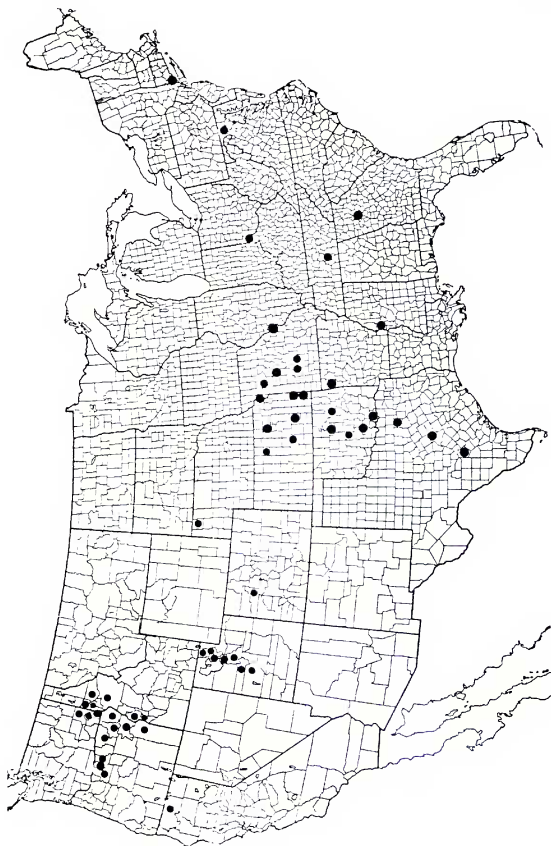


FIG. 2. *Sileneblau dura*. Documented distribution by county in the United States.

Annual. Plants often matted, occasionally solitary, green but becoming stramineous in age. **CULMS** generally prostrate or procumbent to ascending but sometimes erect, branched, 2–18(30) cm tall though mostly less than 15 cm, many from tillering at basal nodes, the nodes glabrous, the internodes glabrous, solid or hollow with narrow lumen, more or less flattened. **LEAVES** basal and cauline, strongly overlapping toward base, usually overtopping inflorescences, the junction of sheath and blade not well defined; *sheaths* closed and tubular in lower 1/4 to 1/2, open above, more or less rounded on lower leaves, rounded to keeled on upper leaves, longer than internodes, glabrous, the margins conspicuously and broadly hyaline, the upper sheaths often inflated; *auricles* absent; *ligules* membranous, broadly triangular, (0.3) 0.75–2 (3.3) [3.5] mm long, glabrous, the margin entire to more or less lacerate, the apex acute; *collars* pale white to yellowish white, glabrous; *blades* flat or folded, (0.15) 0.5–5 (7) cm long, 1–4 mm wide, glabrous above and below or scaberulous on midrib, the apex boat-shaped, the margins entire or scaberulous. **INFLORESCENCE** oblong to broadly elliptic, 1–4 [5] cm long, 0.5–2 [4] cm wide, often partially enclosed in the upper leaf sheath(s), the spikelets overlapping on short, thick pedicels (or nearly sessile) arranged along one side of a more or less zig-zag rachis; middle (and sometimes lower) nodes bearing short branches with 2–5 spikelets, spikelets solitary at upper (and usually lower) nodes, rarely with all nodes bearing only single spikelets; no general mode of disarticulation (see text above). **SPIKELETS** narrowly oblong, laterally compressed, (3.4)5–12 mm long; *florets* (2)3–4(7), upper one or two sterile, the first floret more or less sessile, remaining florets on rachilla joints 1–3.5 mm long and ca. 0.5 mm wide; *glumes* weakly dorsally compressed, both shorter than first lemma, awnless, chartaceous, glabrous, the apices blunt or emarginate, the margins broadly hyaline; first glume lanceolate to narrowly oblong, 1.4–3(3.7) mm long, nerves (1) 3 (5); second glume oblong to elliptic, longer than first glume, 2.6–5.4 (6.2) mm long, nerves (3 or 5) 7 (9); *lemmas* awnless, oblong to narrowly lanceolate, laterally compressed, (3.4) 4.5–5.8 (7) mm long in first floret, (0.4) 1–4.5 (5.9) mm long in remaining florets, chartaceous-indurate, glabrous or scaberulous on midnerve toward apex, incompletely and irregularly (5) 7–9 nerved, the nerves parallel, the apex obtuse, the margins broadly hyaline; *paleas* dorsally compressed, ca. 0.5–1.5 mm shorter than to equalling the lemma, 2-nerved, glabrous or, in upper half of keels, scaberulous, the keels slightly winged in upper 1/2; apex blunt to variously lobed or notched; margins broadly hyaline. **STAMENS** 3, anthers 0.8–1.3 [1.5] mm long. **LODICULES** 2, broadly oblong to oval, 0.75–2 mm long, clawed at base, the apex entire to somewhat

lacerate, the margins entire. CARYOPSES yellowish brown, narrowly lanceolate in outline, 2.1–3.5 mm long, 0.8–1.4 mm wide, rugulose, weakly trigonous, beaked by remnants of persistent styles/stigmas.

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